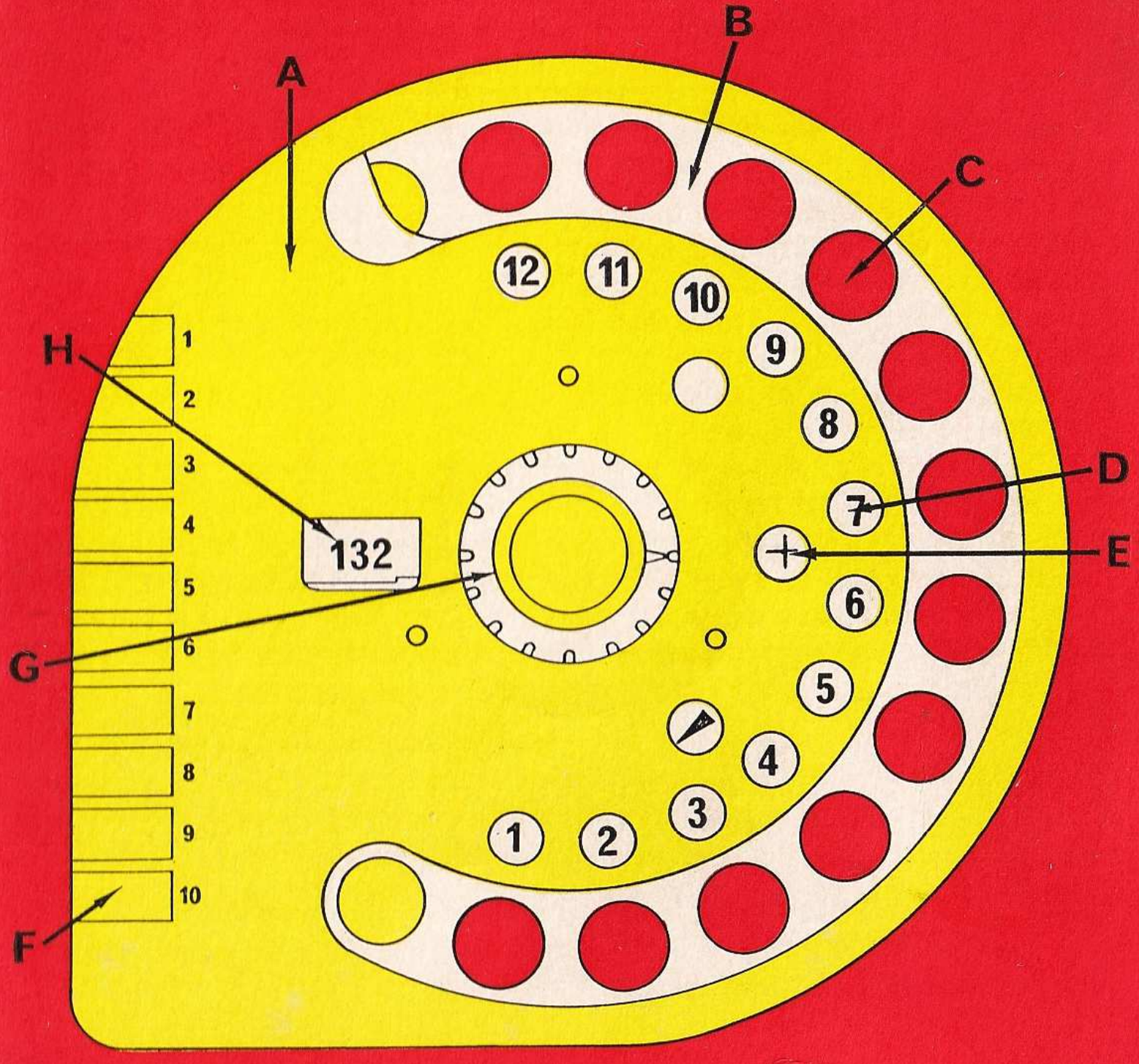
A
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OPERATING INSTRUCTIONS and some suggestions for using THE ADDO PRIMARY CALCULATOR

The ADDO Primary Calculator consists basically of a plastic "box" (A) containing a "dial" with 20 finger holes. (B). An arc cut out of the "lid" of the box makes a proportion of the dial holes visible and operable by the forefinger (as in a telephone dial). (C) Adjacent to the dial holes are numbers from 1-12 (D)—in BLACK with an arrow pointing **towards** the operator (clockwise) for addition and multiplication and in RED with an arrow pointing **away from** the operator (anticlockwise) for subtraction and division. The process is also indicated by a Black plus (+) or a Red minus (−) sign (E) as appropriate. Down the left hand edge are a number of depressions, or tallies (F), numbered from 1-10 to assist the memory in recording the number of operations performed—or "count". Finally the central knob may be "lifted" and turned in either direction to "set" figures or return figures to zero in the answer window. (H) The black indented arrow on the central knob points towards the answer window (i.e. in the "9 o'clock" position) when the "tens" and "hundreds" figures are clear.

PLACE VALUE: Repeated demonstrations of place value are inherent in the use of a Calculating Machine. The letters H. T. U. may be marked above the answer window by sticking on a label or marking with a chinagraph pencil.

ADDITION: Simple addition is performed by placing the finger in the dial hole corresponding to the first factor, drawing this towards the zero position (clockwise) and repeating the operation for each factor. e.g. 5 + 9 = 14, or 5 + 9 + 7 = 21, or 9 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 37 etc. Where factors over 12 are involved, the "tens" figures are added by the central knob and "units" by the dial e.g. 36 + 29—dial 6 and turn knob 3 "clicks" clockwise (36 in answer window) : dial 9

and turn knob 2 "clicks" clockwise (65 in answer window) : repeat for each factor.

MULTIPLICATION: This is best shown to be repeated addition in order to understand thoroughly the process. Thus 4 multiplied by 3 is really 4 added to itself 3 times: thus $4 + 4 + 4 = 12$. This is how the calculator works (and, indeed, basically how every digital calculating machine or digital computer works).

e.g. 4×9: with the numbers showing BLACK and the plus (+) sign showing, engage dial hole 9 with the forefinger of the **right** hand, the first notch or tally with the **left** forefinger, dial. Repeat 4 times moving the left forefinger down one position for each dialling operation as an "aide memoire" for the number of the multiplier.

(NOTE: It is an important exercise to examine the numbers to decide which, by convenience or economy of movement, should be the multiplicand and which the multiplier.)

The learning of tables can be assisted by the combined actions of speaking the tables and dialling at the same time.

In Multiplication combined with addition it is unnecessary to clear the "register", or answer window, between multiplications

e.g. $(7 \times 5) + (9 \times 3) = 62$

$7^2 + 3^2 + 8^2 = 122$

similarly multiplication may be combined with subtraction

e.g. $(7 \times 5) - (9 \times 3) = 8$

(i.e. $7 + 7 + 7 + 7 + 7 - 9 - 9 - 9$)

or $7^2 - 3^2 + 8^2 = 104$

(i.e. $7 + 7 + 7 + 7 + 7 + 7 + 7$
$- 3 - 3 - 3$
$+ 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8$)

SUBTRACTION: The operation of the calculator emphasizes that the first factor is "plus" and the second is "minus" although the "plus" amounts are not usually indicated in this way.

e.g. $11 - 7 = +11 - 7 = 4$

Thus on the calculator, with the indicator plus and the number BLACK, dial +11: with the indicator minus and the numbers RED, dial −7: answer is 4 in the "register" window.

DIVISION: This is simply explained as "repeated subtraction" just as multiplication is repeated addition. Thus 12 ÷ 3 is 12 − 3 − 3 . . . repeated until the original dividend (12) is reduced to zero (or, where the quotient is not exact, until the remainder is less than the divisor) in this case 4 times. The number of times 3 may be subtracted from 12 may be recorded by the left forefinger in the "tallies" just as we record the multiplier. e.g. 37 ÷ 8
With the indicator plus and the numbers BLACK dial 37: with the indicator minus and the numbers RED repeatedly dial 8 away from you keeping "count" of the number of times you are able to do so with your left forefinger.

Many more uses may be made of this device and some of these, together with more detailed explanation of the foregoing, are to be found in the book "Some Suggestions for Using the ADDO Primary Calculator in Schools" by J. A. Clark, B.Sc., inventor of the calculator.

Copies may be obtained from your usual supplier or from

Education & Training Division,
Addo Limited,
Viking House,
5-11 Worship Street,
LONDON, E.C.2. (price 1/6)

GUARANTEE: This Primary Calculator is unconditionally Guaranteed for a period of 12 months from date of purchase. In case of dissatisfaction please return to your supplier, or to Addo Limited, when it will be replaced.